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SOURCE Priroda, No 12, 1950, pp 68-69.N. N. ANDREYEV, FOUNDER OF SOVIET ACOUSTICS

L. M. Brekhovskikh

N. N. Andreyev, now 70, is the foremost Soviet scientist in the field of acoustics. During the last 40 years, he has published many works on problems of the theory of oscillations and acoustics and has solved numerous practical problems of great importance to the national economy and defense. He has organized many research institutes and laboratories for work in acoustics and has taught many students.

Andreyev was born in Moscow on 27 June 1880. He received his secondary schooling in a cadet corps which graduated in 1898. He then entered the Moscow Technical College, but, after a year, was sent to the Saratov District for participation in student disturbances. On his return to Moscow he attended classes at the Technical College during the school year 1899 - 1900, and then entered Moscow University. Here, in his first course, he worked under N. V. Bugayev, professor of mathematics, and became his assistant. In 1904, after 2 years at the university, he went to Germany and studied at Goettingen. In 1906, he entered Basel University in Switzerland, and, in 1909, received the degree of Doctor of Philosophy with honors. During these years, he returned several times to Russia, where various engineering jobs provided him with the means to live and study abroad.

After obtaining his degree at Basel, he returned to Moscow. From 1909 to 1917, he taught physics and mathematics at various secondary schools. During this period, he worked at the Moscow University laboratory (1912); upon passing his Master's examination, he received the title of lecturer at Moscow University and lectured there on the theory of oscillations, statistical mechanics, thermodynamics, and the electron theory of dielectrics.

N. N. Andreyev's first works (1908 - 1909) were on optical phenomena. In 1909, he took up the study of oscillations and solved many extremely important theoretical problems connected with spectra and the spectral resolution of oscillations. A generalization of this work was contained in his Master's thesis (1917) on "Electric Oscillations and Their Spectra," which was the first exhaustive investigation of the spectra of damped waves and their reaction to diffraction gratings and resonators. This work still retains its value.

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From 1918 to 1920, he acted as professor of physics at the Omsk Polytechnic Institute and the Omsk Agricultural Institute. Returning to Moscow in 1920, he began work on military sound ranging at the State Experimental Electrical Engineering Institute. Then, he organized a laboratory on acoustics and low currents which he directed until, in 1926, he moved to Leningrad. During this period, he studied the problem of measuring sound intensity and also the theory of the telephone. In 1924 - 1925, he became professor of physics and mechanics at the Second Moscow University.

As soon as he arrived at Leningrad, he became director of the acoustics laboratory at the Leningrad Physicotechnical Institute. Later, this laboratory was transferred from the Leningrad Physicotechnical Institute to the Leningrad Electrophysics Institute (the latter was subsequently reorganized as Scientific Research Institute No 9). Here, he conducted interesting and productive work on acoustic measurements and other problems in that field and also obtained a large student following. The acoustics laboratory was reorganized in 1938 into Laboratory No 29 of the Central Institute of Aircraft-Engine Building.

During this period he invented some simple but very important methods of sound measurement. He is credited with the well-known sonorous figures usually called Chladni's figures method, which is used in studying the amplitude distribution in vibrating bodies and plays an important part in technical acoustics.

In attempting to simplify measuring methods, he also suggested a touch method (by finger) of measuring vibration amplitudes and showed that it was sufficiently accurate for many practical cases.

Another important work of the period was his investigation (together with I. G. Rusakov) of the propagation of sound in a moving medium, in which the theoretical principles of this phenomenon were set forth for the first time. The numerous studies on nonlinear acoustics made by him, or under his guidance, were another important contribution to science. Rusakov made the first study of sonic wind wind noise?. B. P. Konstantinov developed the theory and application of acoustic jets to detect and amplify sound. Bodner, an engineer, studied the influence of vibrations in the intake and exhaust pipes of internal combustion engines on the power of the engine. Konstantinov and, later, Ye. A. Nepomnyashchy investigated the phenomena of noise in propellers and made substantial progress in this field. Andreyev himself did a great deal of work on mufflers and established a basis for designing them.

In addition to military acoustics, Andreyev took great interest in the acoustics of musical instruments. In Leningrad, he founded the Institute of Musical Instrument Industry and, for many years, was the real director of all its work on acoustics. As a result of its activities, a new school of acoustics for musical instruments was established in the USSR.

Among the institute's works, carried out under his personal direction, were research on the self-excited oscillations of harmonic reeds (Konstantinov), on the structure of wind instruments (A. I. Belov and Konstantinov), on the dynamics of keys and the impact of piano hammers on the strings (A. V. Rimskiy-Korsakov), and on an objective characteristic of timbre. The institute also conducted a series of works on measuring methods applicable to research on musical instruments.

Andreyev personally did a great deal toward establishing criteria for the selection of resonant woods for the sounding boards of musical instruments. Important results were obtained by considering wood as an anisotropic homogeneous material. The result of these studies was that the USSR could discontinue importation of wood for musical instruments from abroad.

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Andreyev also continued his teaching activity in Leningrad. He was head of the chair and laboratory of acoustics which he organized at the Military Electrical Engineering Academy. Under his direction, the number of students specializing in acoustics increased greatly. After he left the academy, the laboratory was named the Laboratory of Electroacoustics imeni Professor N. N. Andreyev. He repeatedly read original lectures on general acoustics and organized a chair of acoustics at the Leningrad Polytechnic Institute.

In 1933, he was elected a Corresponding Member of the Academy of Sciences USSR. In 1936, he organized an acoustics commission, affiliated with the academy, which still carries on systematic work on acoustics. The commission organizes conferences on various scientific and technical problems and has published several symposiums of these conferences. A number of works on absorption of sound, written by Andreyev singly, or jointly with Ye. Ye. Lysenko, have been published in these symposiums.

One of Andreyev's distinguishing traits is his feeling for the original. He always undertakes the newest problems, regardless of the difficulties involved.

In 1937, he was a key figure in working out acoustic problems connected with the design and construction of the Palace of the Soviets. At his request, an acoustic sector was organized in the construction committee of the Palace of the Soviets, qualified acoustics personnel were selected, and much scientific research was accomplished in architectural and electrical acoustics.

To check the scientific side of this work, Andreyev organized a special brigade, attached to the acoustics commission of the Academy of Sciences, whose work was often noted by the construction committee as an example of the successful combination of science and engineering practice.

In 1940, he moved to Moscow and became head of the acoustics laboratory at the Physics Institute, Academy of Sciences USSR, a post which he has occupied up to the present. During World War II, the laboratory, under his direction, completed many important works of a special nature. Andreyev, with a group of colleagues, went directly to the battle area and solved some very serious problems on the spot.

From 1947 up to the present, he has been head of the chair of electrophysics at the All-Union Correspondence Power-Engineering Institute at Moscow.

In 1909, Andreyev became a member of the Russian Physicochemical Society and, in 1930, was elected president of the society.

In 1922, he organized the popular scientific journal Iskra and acted as editor until, in 1926, he moved to Leningrad.

Thus, for 40 years, N. N. Andreyev has carried on intense scientific and organizational activities and published some 90 scientific and popular scientific works.

Andreyev can rightly be called the founder of Russian acoustics.

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